

THURSDAY, MAY 21, 1885

THE BRITISH MUSEUM CATALOGUE OF
LIZARDS

Catalogue of the Lizards in the British Museum (Natural History). By George Albert Boulenger. Vol. I. *Geckonida*, *Eublepharida*, *Uroplatida*, *Pygopodida*, *Agamida*. Second Edition. (1885.)

IT would be difficult to name any order of vertebrates more urgently in need of cataloguing than the lizards. The last general work on the group published in any country was Dr. J. E. Gray's Catalogue, which appeared forty years ago, only six years after the completion of the volumes devoted to lizards in Dumeril and Bibron's great work on Reptiles. The additions made in Dr. Gray's Catalogue were considerable, but many of them were of doubtful value. Thus of fourteen new genera therein added by him to the family of Geckoes alone, but three survive in the present edition, the remainder swell the synonymy.

Mr. Boulenger's Catalogue is a boon to herpetologists and to biologists generally, not only because it places within their reach in a few handy volumes descriptions that have hitherto been widely scattered, but also because the classification proposed, whether it be generally accepted or not, is a distinct advance upon the artificial system hitherto in vogue. It is to be hoped that lizards so closely resembling each other as do, for instance, *Gongylus*, *Ablepharus*, and *Euprepes*, will no longer be classed in three distinct families solely because of trivial differences in the form of the nasal shield and in the development of the lower eyelid. At the same time, as naturalists have but rarely access to a collection of lacertilian skeletons, it is to be regretted that a few diagrams have not been added to the present catalogue, to show the cranial characters and the forms of the vertebræ, clavicles, &c., upon which Mr. Boulenger's families are founded.

A considerable change in some well-known reptilian genera is proposed in the present work, and it is probable that the union, for instance, of *Stellio* and *Trapelus* with *Agama* and of *Bronchocela* with *Calotes* will not be universally acceptable. But no change appears to have been proposed without valid reasons, and the tendency to excessive multiplication of genera on insufficient grounds has become so serious a nuisance in zoology that a diminution in the number is welcome. It is satisfactory to find, on comparison with the catalogue of 1845, that whilst the species attributed to the *Geckonida* have increased from 97 to 270, the genera have only augmented in number from 40 (or if *Eublepharis* and *Uroplates*, now placed in other families, be excluded, 38) to 49, whilst the *Agamida* which, in the earlier list, comprised 79 species, distributed amongst no less than 34 genera (35, including *Hatteria*) now contain 202 species, but only 30 genera. But six new generic names are proposed by Mr. Boulenger in the present work, and only three of these are used for generic groups not previously recognised, the others being intended to replace terms that are inadmissible.

It is almost impossible to form an adequate opinion of the descriptions and synopses in a catalogue of this kind

without testing them extensively, and the only thorough test is to try, by means of them, to identify unknown forms without having a series of specimens of allied species at hand. Most museum publications are deficient in this respect, because the writers do not make sufficient allowance for the difficulties under which those who have occasion to identify animals find themselves. An example or two may be taken from the present work. In the synopsis (p. 114) of *Hemidactylus*, one of the largest and most difficult genera of Geckoes, two groups of species are distinguished, the one by having the "free distal joints of all the digits remarkably short," the other by having them long. In a museum, with other species for comparison, this is a good distinction, but away from any specimens except the one that he is endeavouring to identify it is difficult for a naturalist to tell whether the joints of the lizard he is examining are remarkably short compared with those of other forms. Again, in *Draco* (p. 254) several species are distinguished by having the snout longer or shorter than the diameter of the orbit, but it is not stated how the snout is measured. It is but right to say that such instances appear exceptional in the present catalogue, and that it is very rare to find a work in zoology from which similar examples might not be taken.

One of the chief desiderata in books like the present is accuracy as to localities. The museum catalogues of a past age left much to be desired in this respect, and their shortcomings have had a pernicious influence on the progress of a study of wide biological and geological interest, that of the geographical distribution of animals. It will probably be a long time before all the erroneous localities are weeded out, but it is satisfactory to note the great improvement that has taken place in British Museum catalogues of late years. Where so much care has been expended on the subject as is shown in the present work, it appears almost ungracious to point to such trifling shortcomings as appear, though a few mistakes have naturally crept in. Thus the locality for *Acanthosaura* (*Oriocalotes*) *Kakhienensis* is not in the Khasia hills as stated at p. 305, but Ponsee, in the Kakhien hills, on the borders of Yunan. Again, considering the extensive collections that have been made of late years throughout Bengal, it is very extraordinary, if *Hoplodactylus duvan-celii* and *Gonycephalus bellii* really occur in the province that neither of them has been rediscovered, and the locality should not be recorded without doubt.

Altogether the present volume quite maintains the level that the best recent museum catalogues have led naturalists to expect. Why it should be called a "second edition" is not clear. A comparison of the two editions resembles an antiquarian research. It is necessary to recall a state of zoological knowledge as extinct as the dodo before the conditions under which the so-called first edition was produced can be understood. When the head of the zoological department in the British Museum could propose to divide reptiles into two sections, one called *Squamata*, comprising the orders of lizards and snakes, and the other, called *Cataphracta*, consisting of tortoises, crocodiles, and amphibæniæns, on the ground that the former were clad with scales and the latter with plates, the knowledge of the animals classified was evidently in a rudimentary stage. As if the classification

thus proposed was not sufficiently startling, it was gravely suggested (p. 2) that the five orders of reptiles were "analogous" to similar subdivisions in birds and mammals; the lizards as "climbers" representing the *Insectores* in the former and the *Primates* in the latter, serpents being "carnivorous" corresponding to *Accipitres* and *Ferae*, Emydosaurians (crocodiles) because they are "aquatic" to *Anseres* and *Cete*, tortoises in virtue of being "large-footed" to *Gallinae* and *Ungulata*, and *Amphisbanians* for no particular reason to *Grallae* and *Glires*. It is doubtful whether the authorities of the British Museum would not have done wisely by leaving this farrago of nonsense, one of the last echoes evoked by the once popular quinquennial system of Vigors and Swainson, in well-merited oblivion, and in not calling attention to it by suggesting a comparison between the work by Dr. Gray and that by Mr. Boulenger. However great may be the changes in zoological classification during the next forty years, the difference between the views now held and those that may prevail in the future will scarcely be so revolutionary as that which exists between the first and the second edition of the British Museum Catalogue of Reptiles.

THE SILVER-LEAD DEPOSITS OF NEVADA

The Silver-Lead Deposits of Eureka, Nevada. By J. S. Curtis. 4to. 200 pp. (Washington, D.C., Government Printing Office, 1884.)

THE remarkable mineral district which is dealt with in this memoir is situated in the eastern part of the State of Nevada, about the centre of the dreary region known as the Great Basin, between the Great Salt Lake of Utah and the Sierra Nevada range of California. The business centre of the town, or "mining camp," of Eureka is about 90 miles south of the Palisades Station, on the Central Pacific Railway, with which it is united by a narrow-gauge branch railway. The principal mines situated about Ruby Hill, about $1\frac{1}{2}$ miles west of the town, extend for about a mile along the contact of a limestone, supposed to be of Cambrian age, with an underlying quartzite. The quartzite forms the axis of a steep anticlinal arch, which has been modified on one side by a great fracture known as the Ruby Hill fault, and between this and some secondary fractures, an enormous mass of crushed limestone is included, containing the mineral deposits, or ore bodies proper, which are essentially cave deposits, the hollows between the limestone fragments, which are of all sorts of shapes and sizes, being filled with products of the oxidation of galena, pyrites and mispickel, such as sulphate, carbonate, and arsenate of lead, and brown iron ore, in addition to the unaltered minerals in smaller quantities. The chief mineralogical find of these mines has, however, been of Wulfenite or molybdate of lead, which has been produced in considerable quantity, both in detached crystals of great beauty and interspersed through the mass of the other minerals. As a whole, the ores contain about 33 per cent. of lead, 30 ozs. of silver, and about $1\frac{1}{2}$ ozs. of gold per ton. These ore bodies are of every possible form and size, from small strings up to masses measuring upwards of 100 feet in all directions;

but in spite of this great irregularity of form, they are generally connected with systems of fissures or channels, and it is by following these fissures that most of the great discoveries have been made.

Although mines extend for nearly a mile along the hill, the most valuable portions of the deposit are included within a length of about 500 yards at the north-western end belonging to the Eureka and Richmond Mining Companies; and, as the largest development of ore has been on or near the boundary dividing the two properties, disputes as to the ownership of different masses have been followed by litigation culminating in a law-suit which in some way recalls the famous Torbane Hill case of the Scotch courts; the principal mining and geological experts of the United States, when called in as witnesses, being about equally divided in opinion as to whether the zone of limestone containing the ore was a lode or not. In the first judgment the affirmative view prevailed, and was maintained on appeal, although the case appears to have been ultimately decided upon considerations of previous agreements as to boundary lines between the two companies rather than on technical definitions. The absurdity of attempting to apply precise definitions to such essentially irregular objects as mineral deposits has never been so well demonstrated as in this famous case.

As regards the origin of the ores, the author considers them to have been deposited by hot springs constituting the final episode of a period of volcanic activity, evidence of which is found in the neighbourhood, though not in the immediate vicinity of the mines. A large number of assays of the limestone and quartzite rocks enclosing the deposits have been made, proving them to contain silver of the value of from fourpence to twenty-two pence per ton, which, however, in the author's opinion shows conclusively that the materials for the ore could not have been derived from any of the sedimentary formations.

The systematic assaying of the rock has been attempted to be utilised as a method of discovering ore bodies, as have also experiments upon variations in electrical activity, but as yet without practical results, although a curious coincidence has been observed in the indications given by the two methods.

The yield of precious metals of the Ruby Hill mines between 1869 and the date of the author's report, 1883, has been about 15,000,000*l.*, the value in the proportion of about one-third of gold to two-thirds of silver, in addition to about 225,000 tons of lead. Both the smelting and desilverising of the ore are done on the spot, the latter being effected by the inverse Pattinson process of Luce and Rozan, in which the lead is crystallised by injecting steam, and the liquid lead is run off from the impoverished crystals. This is perhaps the largest application that this process has yet received.

The lower workings of the mines, although they have been extended to a depth of 1200 feet, have not as yet led to any discoveries comparable with those made between 300 and 700 feet below the surface. The author, however, considers the chances of finding ore in depth to be favourable.

Taken as a whole the volume is a very interesting one, and is well illustrated, although for practical purposes the scale of the plans and sections is rather small, and